E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
5215 KENNEDY AVENUE
EAST CHICAGO, INDIANA 46312

CHEMICALS, DYES AND PIGMENTS DEPARTMENT

April 29, 1980

CERTIFIED MAIL

RETURN RECEIPT REQUESTED

Sandra S. Gardebring
Director, Enforcement Division
U.S. EPA, Region V
230 South Dearborn ST., 13th Floor
Chicago, Illinois 60604

Attention: Jerrold Frumm

Re: Information Request
E. I. du Pont de Nemours & Co.
East Chicago, Indiana

Dear Ms. Gardebring:

We are replying to your information request which was addressed to Mr. Robert J. Blair and received on April 1 on the subject of solid wastes and their disposal at our East Chicago facility.

As background information, the East Chicago plant was established in 1892 and therefore has a long history of operation. Many of the products that were made during those 88 years are no longer being manufactured. Waste disposal practices have changed over that span of years such that it is difficult if not impossible to find any records or persons with knowledge of many of the old defunct operations. As part of the Congressional Questionnaire of the House Subcommittee on Oversight and Investigations East Chicago submitted information about waste disposal since 1950. Much of the information submitted by East Chicago to that committee, and now to you, is the same. For the Congressional Questionnaire we estimated 15,000 tons of solid wastes were disposed of on the plant for the period 1974 through 1978. We do not have sufficient information to specifically estimate the amounts in the individual disposal areas before 1974.

We have attached a map as Attachment A identifying the known disposal areas which have been used for the disposal of solid wastes.

This map was prepared in 1971 by a long service employee now retired who based it on his recollection of some of the older operations. It has been updated to include disposal since that time. Attachment B is the legend that describes the disposal areas.

ZnCl is a skin irritant; fumes are highly toxic

- Area 1 was used for wastes from the manufacture of zinc, aluminum and ammonium chlorides from 1909 - 1969. None of these products has been manufactured at East Chicago since 1969. The wastes were "muds" produced from filtering operations. No known treatment was provided subsequent to disposal and no records found as to amounts or compositions.

- Area 2 was used for disposal of chain grate stoker ash from our coal-burning Powerhouse until 1950. No known treatment was provided subsequent to disposal and no records found as to amounts or composition.

- Area 3 was used for wastes from our trisodium phosphate operation from 1926 - 1951. The waste was calcium sulphate. No known treatment was provided subsequent to disposal and no records found as to amounts or composition.

- Area 4 is a general waste area used from 1955 - 1974 for disposal of miscellaneous chemicals including sulfur and filter aid. Also included were sludges from tank cleaning and process cleaning operations. These sludges were principally calcium sulfate and sodium silicate. Spent silica gel used for removing fluoride from hydrochloric acid and alumina gel used for drying Freon® were disposed of in this area along with old building materials such as scrap brick. Dust from the screening of vanadium oxide catalyst from the sulfuric acid operation was disposed of in this area prior to 1970. Since 1970 screenings and used catalyst are recycled or sold. Some spent catalyst was probably disposed of in earlier years but no records were found as to amount.

  V$_2$O$_5$ dust is toxic by inhalation

  For many years the area was used for open burning of plant trash such as paper bags, pallets and garbage. In 1972 and 1973 we burned about 1000 drums, 55 gallon capacity, containing methyl ethyl ketone and an organic sludge from our Benomyl herbicide operation produced in 1968 - 1970. We also burned an unrecorded amount of hexane wastes from a similar herbicide operation known as Siduron. A copy of our request and the permit from the City of East Chicago's Department of Air Quality is Attachment C.

  See pages from the "Pesticide Dictionary"

- Area 5 was a neutralizing pit containing limestone. The pit was used from 1941 to 1974 to neutralize a small acidic waste steam containing fluorides from the Freon® operation. New facilities were installed to neutralize and landfill this waste in 1974. (See Area 10.) In addition, the pit was used to neutralize by-product hydrochloric acid production from 1965 to 1970 on an intermittent basis when we were unable to sell all the material produced. A record of this disposal was found as given in Attachment D. The pit was also used to dispose of an antimony pentachloride catalyst from 1948 until 1967. While no records are available, a Freon® area employee recalls the amount as 18-20,000 pounds of antimony pentachloride disposed of in catalyst changes every two or three years for the period 1949 through 1967. No catalyst was disposed of in this area after 1967 when a recycling process for the catalyst was developed.

$SbCl_5$ is toxic and corrosive

- Area 6 was used for disposal of yearly cleanout of zinc "sinters" (zinc oxide) from a zinc sulfide roasting operation from 1947 until the operation was shut down in 1967. Filter aid and some sulfur which was mixed with the filter aid were disposed of this area. This waste came from the melting and filtering of sulfur used as a crude in the sulfuric acid process. The unit discontinued filtering sulfur about 1967. No treatment methods were used and no records were found as to amounts.

- Area 7 was used for disposal of fly ash from a coal-burning powerhouse. The disposal was discontinued in 1969 when a new powerhouse using natural gas was installed. No treatment methods were used and no records kept of amounts.

$Ca_3(AsO_4)_2$ is highly toxic & a suspected human carcinogen.

$Pb_3(AsO_4)_2$ is highly toxic

- Area 8 was apparently used for disposal from several insecticide operations, calcium arsenate and lead arsenate. No known records were found as to treatment method or amount. These processes operated from 1910 to 1949.

- Area 10 was used for disposal of calcium fluoride from the Freon® operation from 1974 until its shutdown in 1977. The area was lined with bentonite clay as required by the State of Indiana permit. A description of the treatment method is given in pages 7 and 8 of Attachment E. Attachment F gives some data on amount and composition of the material listed as Freon® sludge.

All of the above disposal areas are now inactive. The only active disposal area on site now is Area 9 as shown on the map. This disposal area is essentially the same as Area 3 which contained calcium sulfate from another operation. Since 1974 this area has been used to dispose of "sludge" generated by the water treatment facilities installed in the early 1970's to reduce water pollution. These wastes are generated by our sodium silicate and Ludox® colloidal silica processes and are described in detail in Attachment E. Not included in Attachment E is the photograph of the landfill area which was supplied to the Indiana Stream Pollution Control Board (copy not found). A description of Area 9 is also given in this attachment along with a breakdown of the waste composition as calculated for 1974. These data are essentially representative of the waste disposal in this area for the period 1974 - 1977. In 1977 the waste disposal from the sulfamic acid department "Ammate" dry cake filter shown on pages 18 and 19 of Attachment E was discontinued when that part of the operation was shut down permanently. We estimate about 2500 tons of waste on a dry basis were disposed of in Area 9 in 1978 and this amount probably is a good estimate for 1979 also. Of this material about 2300 tons was the "sludge" from water treatment facilities. This "sludge" which is also called precoat filter waste and "hardtac" waste, consisted of about 54% calcium sulfate, 20% diatomateous earth (filter aid) 16% silica and silicate solids, 9% calcium hydroxide and 1% cellulose (filter aid) on a calculated basis. Some miscellaneous analytical data are given in Attachment G. Attachment H gives some typical analyses of the diatomateous earth (filter aid) and hydrated lime that are used in the operation and end up in the waste. About 170 tons of sodium silicate from storage tank cleaning was disposed of in this area. Also about 40 tons of calcium sulfate sludge from the cleaning of Sulfuric acid storage tanks. This acid sludge was neutralized with limestone prior to landfilling. About 1 ton of cleanout from the Lorox® herbicide operation was disposed of. This material was diluted with water to about 1% solids concentration prior to landfilling. The composition of the solids was about 50% linuron and the balance clay and other diluents.

Your letter also requested results of hydrological and geological sampling and analysis. We have submitted as Attachment I a report by Shilts, Graves and Associates, Inc. on this subject. This investigation was done on the eastern portion of our property for the City of East Chicago. The copy of this report which Du Pont received did not contain the water analyses referred to in the third paragraph of page 2. We have included a property map of the plant as a reference.

We have attached some other miscellaneous documents which we feel relate to your information request. These are:

Attachment J - Approval by the Indiana Stream Pollution Control Board of our wastewater treatment facilities including the landfilling operation.

Attachment K - Letter dated January 31, 1977 from Indiana Stream Pollution Control Board reviewing and approving our plant waste disposal practices.

As required under the request for information, the answers are notarized and submitted under my signature certifying that all statements contained herein are true and accurate to the best of my knowledge and belief. Also all documents submitted are certified to be true and authentic copies to the best of my knowledge and belief.

Very truly yours,

John T Sixsmith

J. T. Sixsmith
Environmental Control
Coordinator

STATE OF INDIANA)
) SS
COUNTY OF LAKE)

SUBSCRIBED AND SWORN TO BEFORE ME THIS 29th DAY OF April, 1980.

Olga V. Horvath

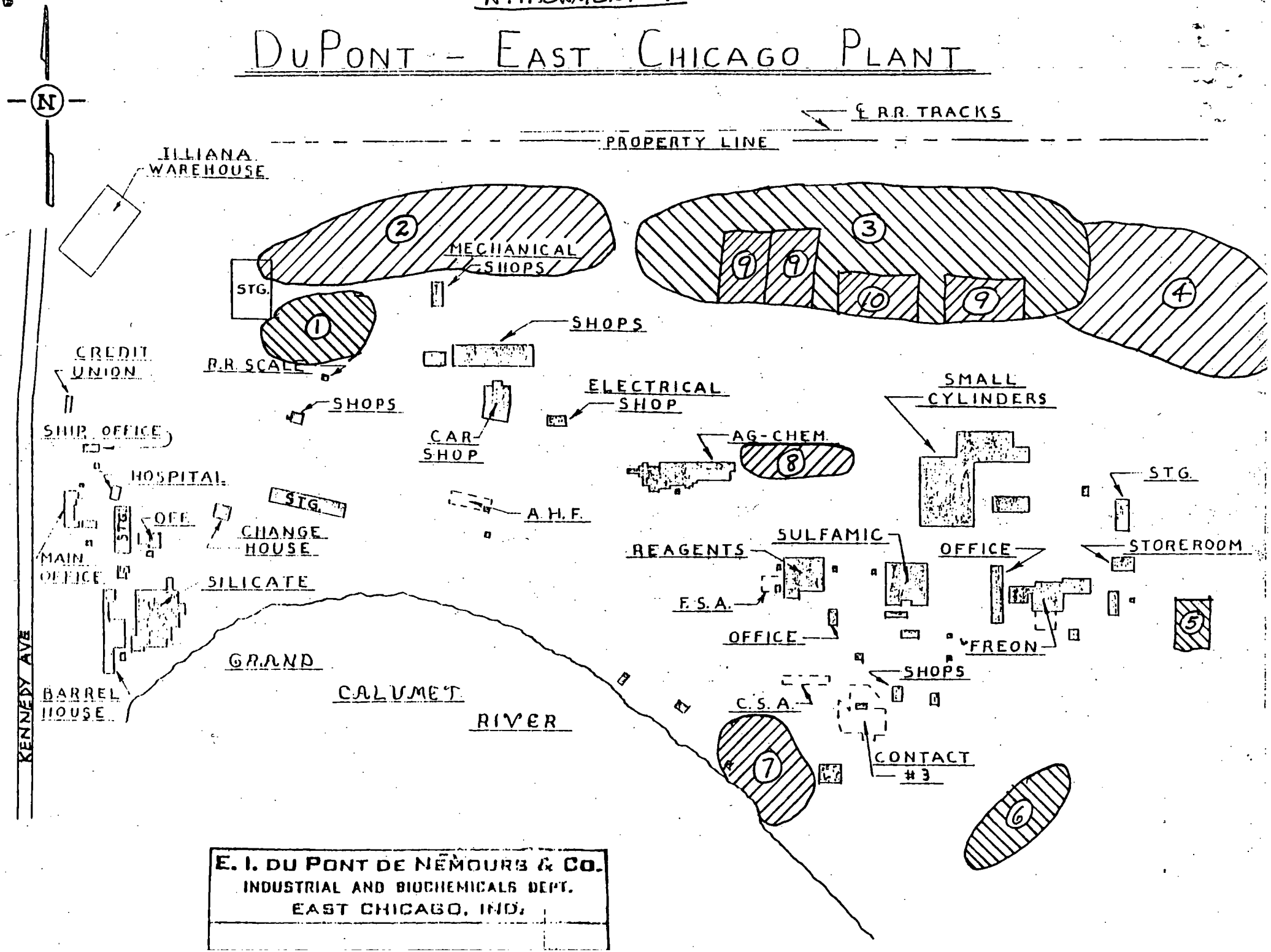
Notary Public in and for said
County and State

My Commission Expires: 10-27-80

cc: Oral Hert, Technical Secretary
Indiana Stream Pollution Control Board
1330 W. Michigan Street
Indianapolis, Indiana 46206

ATTACHMENT A

DuPont - East Chicago Plant



E. I. DU PONT DE NEMOURS & CO.
INDUSTRIAL AND BIOCHEMICALS DEPT.
EAST CHICAGO, IND.

EAST CHICAGO INACTIVE LAND DISPOSAL SITES

ATTACHMENT B

Area Number	Location	General Description of Facility	Disposal Dates	General Description of Waste	Facility Construction	Site & Ground Water Conditions
1	See map	Waste pile	1909-1969	Waste from manufacture of zinc, aluminum and ammonium chlorides	Waste pile, ∿300' x 300'	Unknown
2	See map	Waste pile	Thru 1955	Chain grate stoker ash from old powerhouse	Waste pile, ∿1,000' x 400'	Unknown
3	See map	Waste pile	1926-1951	Calcium sulfate from trisodium phosphate operation	Waste pile, ∿1,000' x 400'	Unknown
4	See map	General dump area	1955-1974	Misc. chemicals, including sulfur and filter aid	Waste pile, ∿1,000' x 1,000'	Unknown
5	See map	Neutralizing pit	1941-1974	HCl from Freon® operations	∿200' x 200' unlined pit containing limestone	Unknown
6	See map	Waste pile	1947-1967	Zinc sinters from roasters, sulfur, and sulfur filter aid	Waste pile, ∿400' x 500'	Unknown
7	See map	Waste pile	Thru 1969	Fly ash from old powerhouse	Waste pile ∿400' x 200'	Unknown
8	See map	Waste pile	1910-1949	Lead arsenate and calcium arsenate wastes	Waste pile, ∿400' x 200'	Unknown
10	See map	Waste landfill	1974-1977	Calcium Fluoride	Clay-lined landfill ∿200' x 250'	Unknown

JTS/ckg
4/18/80

ATTACHMENT C

(S. T. Allen, " E.C
(V. G. Koppin, " "
(D. J. Willette, " "
(File: TAB 12.3

Manual of Technology

July 28, 1972

Mr. Dennis T. Karas, Director
Department of Air Quality Control
City Hall
East Chicago, Indiana 46312

Dear Mr. Karas:

We request an open burning permit to dispose of a quantity of liquid organic waste at our East Chicago Plant. This waste is a by-product of an operation that is no longer located in East Chicago. We have stored this waste for about two years while trying to find another suitable method of disposal which would not create a more serious pollution problem. We have been unsuccessful in finding such a method and therefore have concluded that open burning is the only acceptable solution.

About 1000 drums, 55 gallon capacity, containing methyl ethyl ketone and an organic sludge will be disposed of. The burning will take place in small lots at our dump site on the east end of the plant. A hole will be dug and about 10 drums placed into the hole and the contents ignited. After burning, the drums will be inspected for completeness of combustion and the drums removed to scrap. The location of the burning site is such that it is not a hazard to buildings or equipment. The products of combustion are carbon dioxide and water vapor. Burning will be scheduled only when the wind direction is favorable so that no highway or residential area is affected. We have tested this method and have found that the material burns with a clean flame with little or no dark smoke or particulate, and no odor.

We request this permit for a period of one year but hope to complete disposal in two months.

J. T. Sixsmith
Environmental Control
Coordinator

E. I. du Pont de Nemours & Co.
5215 Kennedy Avenue
East Chicago, Indiana 46312
398-2040

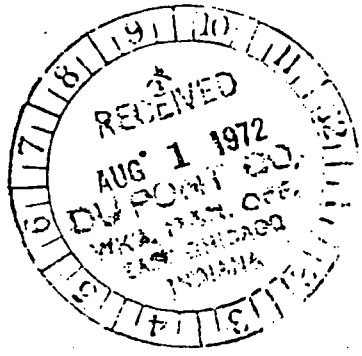
JTS:crc

ATTACHMENT C

...ctor / DENNIS T. KARAS

mayor / ROBERT A. PASTR

...EPARTMENT OF AIR QUALITY CONTROL / EAST CHICAG



July 31, 1972

Mr. J. T. Sixsmith
Environmental Control Coordinator
E. I. DuPont De Nemours & Company, Inc.
5215 Kennedy Avenue
East Chicago, Indiana

Dear Mr. Sixsmith:

This letter is in regard to your letter of July 28, 1972, which requests an open burning permit to dispose of a specific quantity of liquid organic waste.

Your letter guarantees no pollution problem and describes the specific method of burning.

On this basis, this office gives your company a conditional permit for the above stated operation.

Sincerely yours,

Dennis T. Karas

Dennis T. Karas, Director
Department of Air Quality Control

DTK:fs

G-46-A REV. 8-68

Attachment D

ENGINEERING DUPONT COMPUTATION SHEET

TRC-20

SHEET NO.

TITLE OF PROJ. OR STUDY

PROJ. OR STUDY NO.

SUBJECT "Frear" Mfg., East Chicago

WORKS

COMPUTER RFH DATE 5/3/71 19

Hydrochloric Acid Ditchings

Year	M lbs HCl 100%	M lbs Cl^-
1965	2500	2430
1966	0	0
1967	4700	4570
1968	660	640
1969	800	780
1970	1650	1610
1971 (to date)	0	0
Total	10,310	10,030

M = 1000 LBS

IC [illegible] REV. 12-71

ATTACHMENT E

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
EAST CHICAGO, INDIANA 46312

INDUSTRIAL CHEMICALS DEPARTMENT

July 20, 1973

Mr. Oral H. Hert, Technical Secretary
Stream Pollution Control Board
1330 W. Michigan Street
Indianapolis, Indiana 46207

Dear Mr. Hert:

As we previously informed you in our letter of February 2, 1973, the Du Pont Company's East Chicago plant is proceeding on a water pollution abatement program in line with a consent decree signed November 14, 1972, resolving a pollution action by the Federal Government. We submitted an application for preliminary approval of these plans to the Stream Pollution Control Board and received Board approval on February 20, 1973. These plans included projects for outfall consolidation with facilities for pH control and limitation of effluent discharges with landfilling of removed solids.

Now we are requesting final approval of this application by the Stream Pollution Control Board as required by the Board so that we can proceed with the completion of the abatement facilities. The planned startup of the various elements is governed by the timing specified in the court decree with overall completion by October 15, 1974.

We have attached a description of the various projects including flowsheets and abatement facilities. Design is now final. We have indicated those facilities which have been changed from the preliminary design by "Rev. 6/73" at the bottom of the sheets. Those which do not have this designation are the same as submitted in February.

Please do not hesitate to contact us if you have any questio or need additional information.

Yours truly,

J. T. Sixsmith

J. T. Sixsmith
Environmental Control Coordinator

JTS:lcs
Attachments

Proposed Landfill

E. I. DuPont DeNemours & Company, Inc.

East Chicago Plant

The following outlines our proposal to construct and operate a landfill at the East Chicago, Indiana Plant of E. I. DuPont DeNemours & Company, Inc., located at 5215 Kennedy Avenue.

Characteristics of Proposed Landfill Area

The proposed landfill area, as shown on the attached map and photograph, is on the site formerly used to landfill calcium sulfate residues from a former sodium phosphate operation. The approximate soil profile in this area is (1) calcium sulfate to a depth of 7 ft below grade level (2) fine sand to a depth of 30 ft and (3) a gray clay base to about 150 ft. The water table is about 11 ft below grade level.

Method of Construction and Operation of the Landfill Area

Approximately 7 acres will be required during the first 5 years of operation. The landfill area will be diked as necessary to avoid fill material reaching adjacent areas not now containing calcium sulfate. The waste will be collected in portable containers which will be transported to the landfill area and deposited on the existing calcium sulfate. The area will be filled and allowed to compact to a final height of about 6 ft above present grade level. Approximately one

acre will be worked at a time, then allowed to dry and compact while a different area is worked. When the final height of 6 ft is reached, the area will be covered with dirt.

Landfill Materials-Composition (Best Estimates Based on Laborato Data.)

Total volume of wastes is 360,000 cubic feet or 8 acre-ft per year of following composition:

	%	Quantity lb/day
H_2O	52.2	30,000
$CaSO_4 \cdot 2H_2O$	31.3	18,000
SiO_2	6.3	3,600
$Ca(OH)_2$	2.4	1,400
CaF_2	5.6	3,200
Na_2SO_4	1.0	540
Al_2O_3) Fe_2O_3)	.2	120
Cellulose	.3	160
$NH_4SO_3NH_2$	.2	100
$AlCl_3 \cdot 6H_2O$	< .1	10
NaCl	.1	50
Na, as Na_2O (ex silicate)	.4	220
Misc. acid & water insolubles	< .1	12
Heavy metals	< .02	8
	100	57,420 or Approximat 57,000

PROPOSED

ENVIRONMENTAL CONTROL PROJECTS

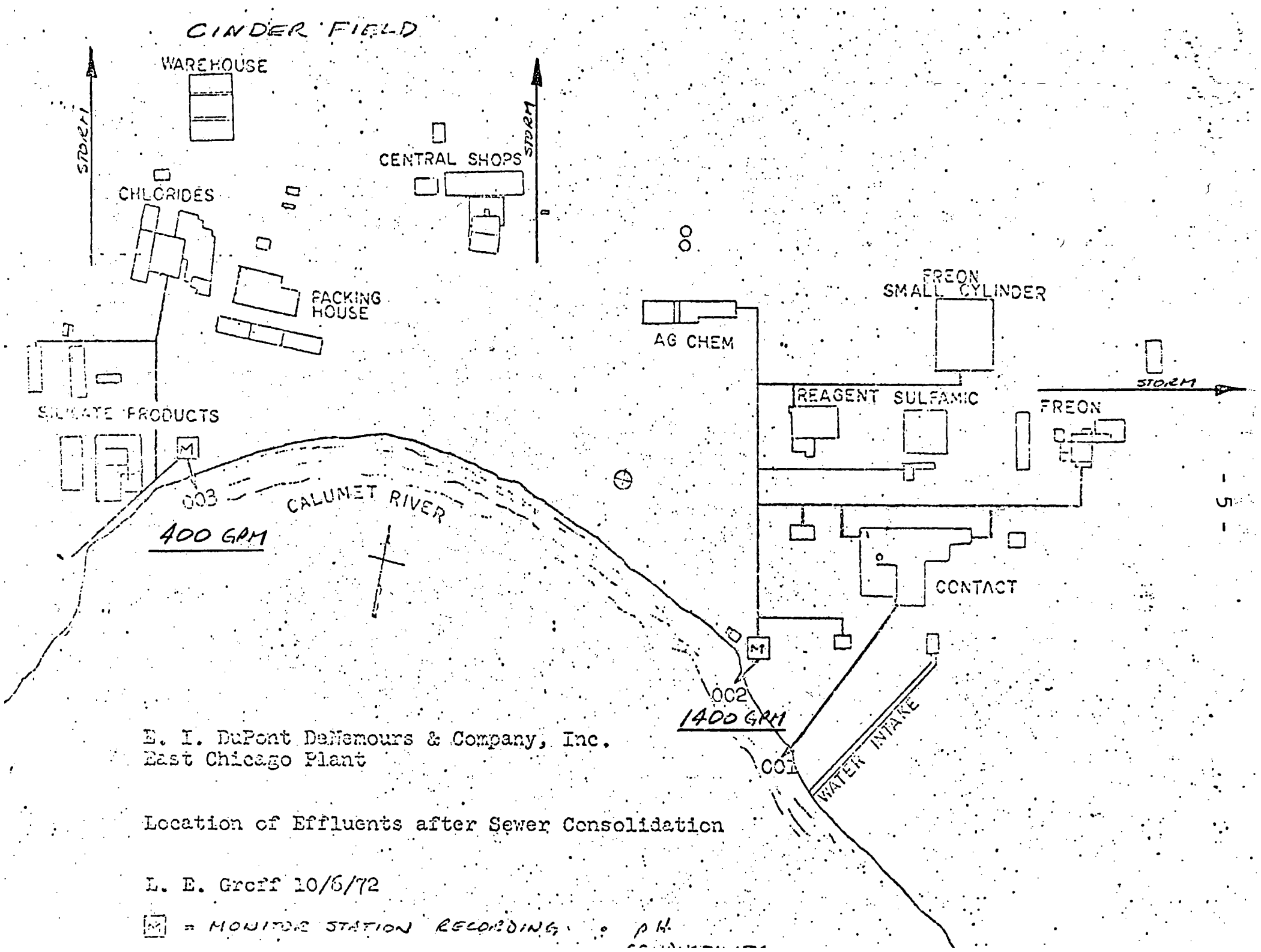
E. I. DU PONT DE NEMOURS & CO., INC.

EAST CHICAGO PLANT

- Sewer consolidation
- Calcium fluoride precipitation
- Effluent pH control - East outfall (002)
- Suspended solids reduction and pH control - West outfall (003)
- Ammate® (ammonium sulfamate) dry cake filter
- Ludox® (colloidal silica) lime precipitation

- Sewer Consolidation

  The objective is to reduce the number of process outfalls from the plant. Upon completion, the plant will have one non-contact cooling water discharge (001), and two process outfalls (002 and 003).



E. I. DuPont DeNemours & Company, Inc.
East Chicago Plant

Location of Effluents after Sewer Consolidation

L. E. Greff 10/6/72

[M] = MONITOR STATION RECORDING pH

DESCRIPTION OF PROPOSED FACILITIES

The new sewer system will be constructed primarily of vitrified clay pipe. Joints will be sealed with premolded polyurethane gaskets. Some PVC (polyvinyl chloride) pipe will be used in the "Freon" Products area. The outfall pipes will be made of Flextran® glass fiber-polyester materials. Piping specifications state that infiltration or exfiltration must not exceed 50 gallons per inch of pipe diameter per mile of sewer per day.

A 10,000 gallon capacity basin will be provided for the sulfamic acid area for emergency spill containment.

All existing outfalls will be removed a minimum of ten feet from the river and the sewer pipe will be plugged. The existing sewer system which presently carries process and storm water will then be isolated from the new process sewers. The existing sewers will be used to direct most of the storm water run-off to vacant areas on the plant site. The existing sewers will carry storm water from the center and west end of the plant to the cinder field north of the warehouse and central shops (see attached map). At each of these points, water will be discharged to a new 200 ft. trench dug five feet below ground level. Storm water will disperse in the porous cinder field. Storm water from the east end of the plant will flow through the existing sewers to an existing settling pit from which it will overflow into the low sandy area east of "Freon" Products and soak into the sandy soil.

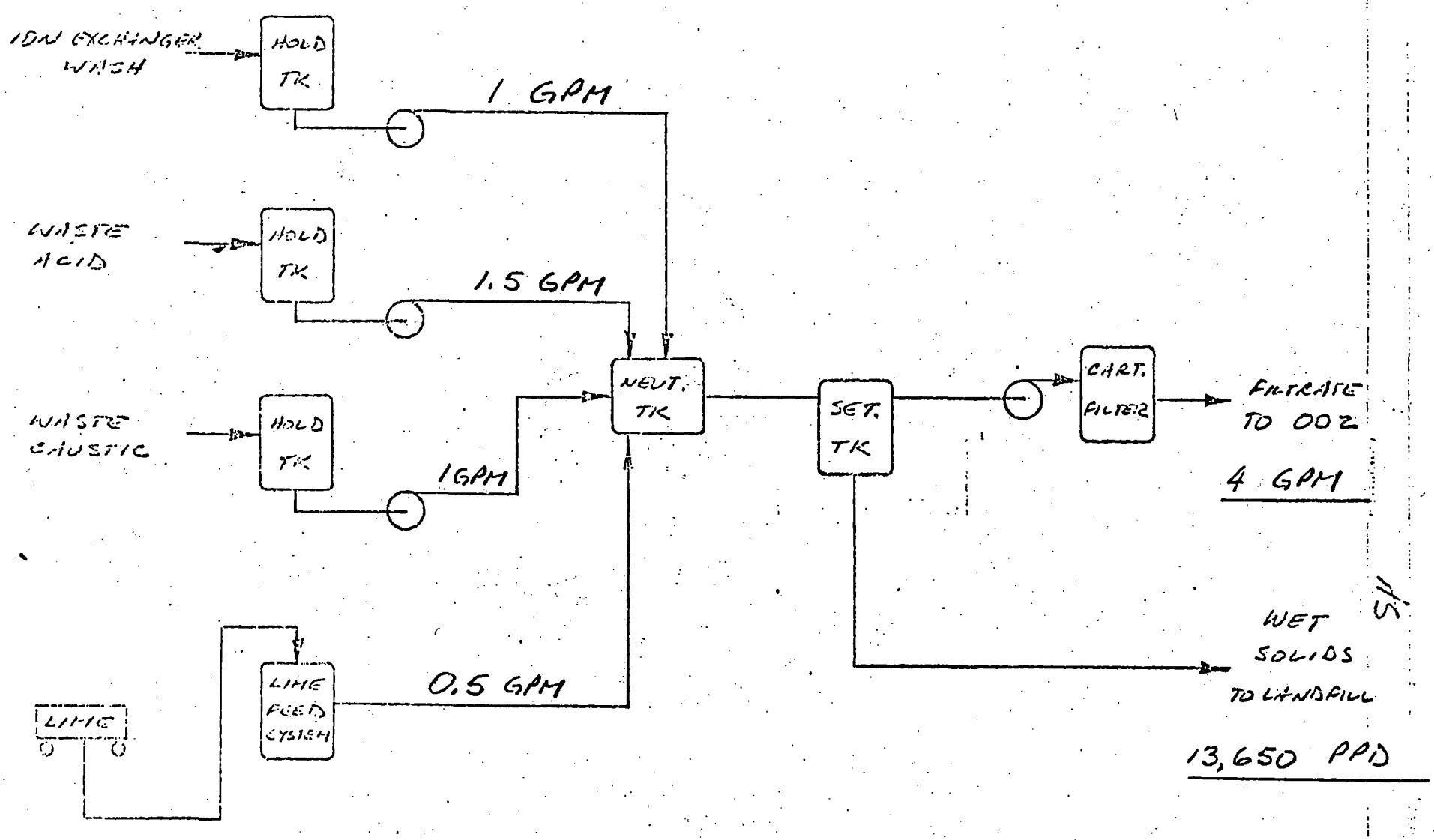
Assuming a heavy storm (5 inches/hour, 10 minutes duration, one occurrence in 10 years), the estimated storm water flows are as follows:

- north of warehouse - 7500 gpm
- north of central shops - 7200 gpm
- east of "Freon" Products - 3300 gpm

These flows will not exceed the reservoir capacity of the receiving areas.

- Calcium Fluoride Precipitation

  Fluoride-bearing liquid wastes will be treated with lime to precipitate CaF_2. Solids will be separated and removed to the landfill. Neutralized liquid will be discharged to consolidated process sewer.



CALCIUM FLUORIDE PRECIPITATION

DESCRIPTION OF PROPOSED EQUIPMENT

Waste Acid Hold Tank

This will be a new 2200 gallon tank made of materials resistant to 0 - 5% HF solutions.

Waste Caustic Hold Tank

New 3500 gallon carbon steel tank.

Ion Exchanger Wash Tank

New 7200 gallon tank similar in design to the waste acid hold tank.

Lime Feed System

Powdered lime will be slurried in water and added at a controlled rate to the neutralization reactor. New 35,000 gallon agitated carbon steel tank will slurry dry bulk lime upon delivery.

Neutralization Tank

This will be a new 1500 gallon reactor for precipitation of CaF_2.

Settling Tank

New tank, 46,000 gallon carbon steel, with a sloped bottom for ease of removing accumulated solids.

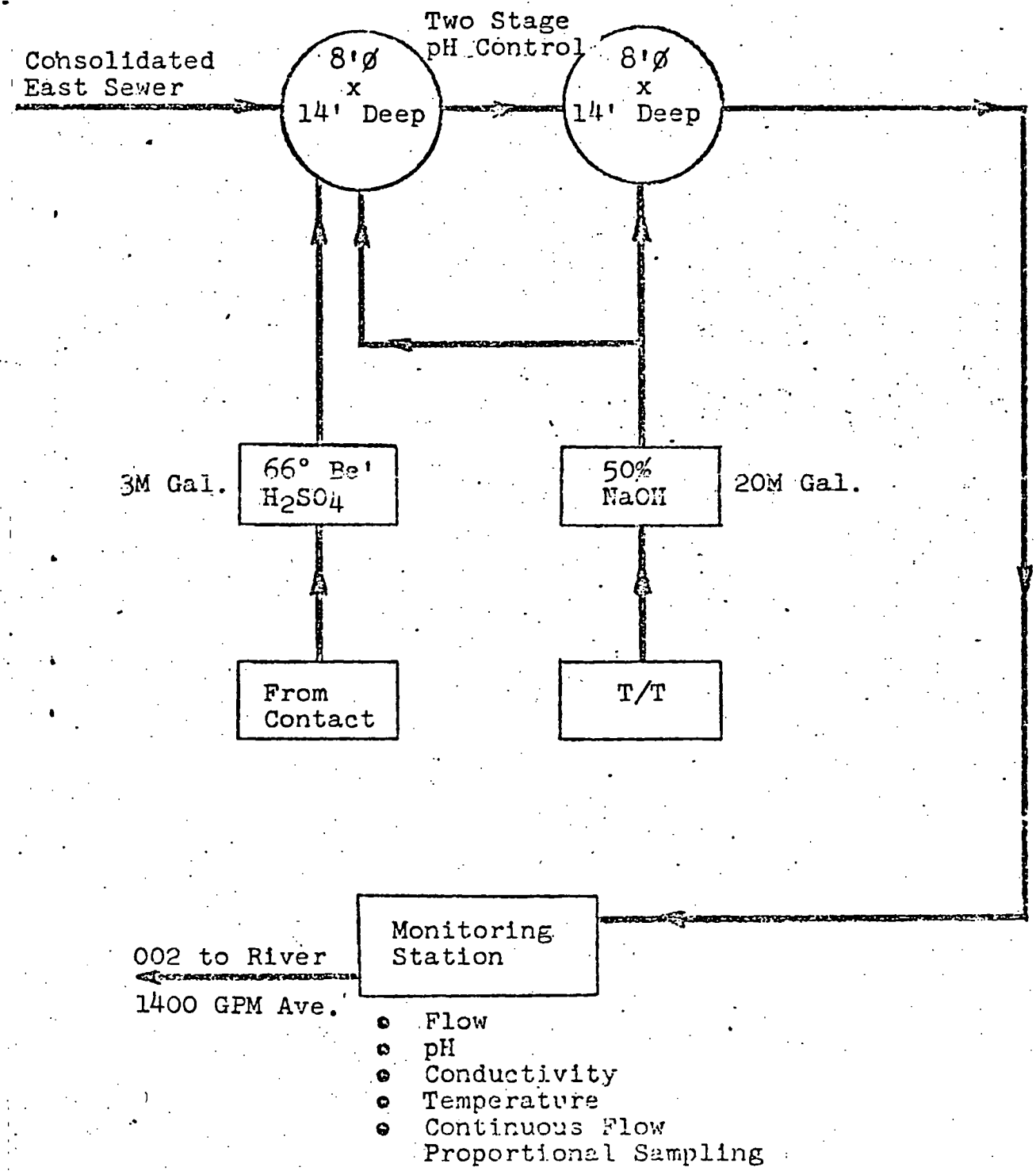
Cartridge Filter

Two cartridge-type filters will be installed in parallel downstream of the settling tank to clarify the supernate before discharging it to the sewer.

EFFLUENT pH CONTROL - EAST OUTFALL (002)

Sulfuric acid or sodium hydroxide will be added to the consolidated process sewer as necessary to prevent discharges during any one-hour period from having an average pH below 6.5 or above 9.0.

pH CONTROL - 002 OUTFALL



Rev. 6/73

DESCRIPTION OF PROPOSED EQUIPMENT

002 Fresh Sulfuric Acid Storage Tank

A new 3000 gallon tank for storage of 66°Be' (93.19%) sulfuric a

002 Caustic Storage Tank

A new 20,000 gallon tank for storage of 50% sodium hydroxide.

002 pH Control System

Two new neutralization tanks will be installed for mixing causti or acid with the effluent. The pH will be adjusted to 4 in the first tank and to 6.5-9 in the second tank.

002 Monitor Station

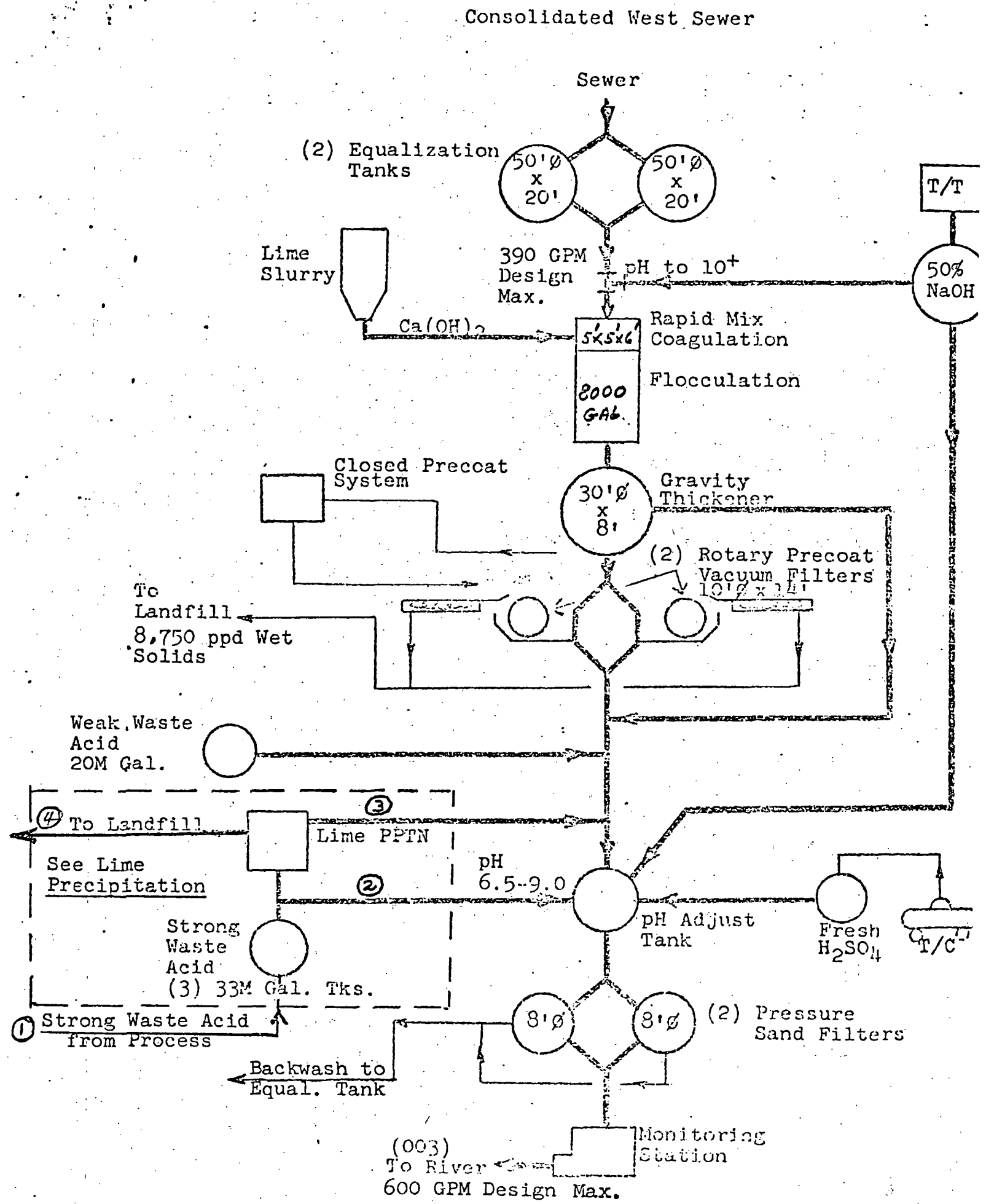
A concrete pit in the sewer equipped with instrumentation for continuous recording of

- pH
- conductivity
- temperature
- flow rate.

Monitor pit will also contain a device for continuous flow-proportioned sampling of 002 effluent.

- SUSPENDED SOLIDS REDUCTION AND pH CONTROL - WEST OUTFALL (003)

The consolidated 003 sewer stream will be process through pH adjustment, flocculation, thickening and filtration to remove suspended solids from it prior to final pH adjustment and discharge into the river. No discharge during any one-hour period will have an average pH below 6.5 or above 9.0.


Consolidated West Sewer
Sewer
(2) Equalization Tanks
50'Ø x 20'
50'Ø x 20'
T/T
Lime Slurry
390 GPM Design Max.
pH to 10+
50% NaOH
Ca(OH)2
5'x5'x6'
Rapid Mix Coagulation
8000 GAL.
Flocculation
Closed Precoat System
30'Ø x 8'
Gravity Thickener
(2) Rotary Precoat Vacuum Filters
To Landfill
8,750 ppd Wet Solids
Weak Waste Acid
20M Gal.
④ To Landfill
③
Lime PPTN
See Lime Precipitation
②
pH 6.5-9.0
pH Adjust Tank
Fresh H2SO4
T/C
Strong Waste Acid
(3) 33M Gal. Tks.
① Strong Waste Acid from Process
8'Ø
8'Ø
(2) Pressure Sand Filters
Backwash to Equal. Tank
Monitoring Station
(003) To River
600 GPM Design Max.

Rev. 6/73

DESCRIPTION OF PROPOSED EQUIPMENT

EQUALIZATION TANKS

Two new surge tanks, each 50 ft. dia. x 20 ft. high. Total volume 600,000 gallons.

pH ADJUSTMENT

Pipeline mixing to raise pH to above 10.

COAGULATOR

A new rectangular agitated tank, 5 ft. x 5 ft. x 6 ft. Used for mixing sewer flow with lime slurry.

FLOCCULATOR

Slowly agitated rectangular tank with a volume of 8000 gallons. New.

GRAVITY THICKENER

New tank, 30 ft. dia. x 8 ft. high. Equipped with a stirrer and sludge removal facilities.

ROTARY PRECOAT VACUUM FILTERS

Two new filters, each 10 ft. dia. x 14 ft. long. Equipped with a closed precoat system which recycles precoat filtrate. Conveyors will be provided to remove filter cake.

003 pH CONTROL SYSTEM

A new 1,500 gallon tank with agitator and baffles for continuous pH adjustment of the sewer stream.

003 FRESH SULFURIC ACID STORAGE TANK

An existing 4700 gal. tank used for storage of 66°Be' (93.19%) sulfuric acid.

003 SODIUM HYDROXIDE STORAGE TANK

An existing 30,000 gal. tank for storage of 50% sodium hydroxide.

LIME PRECIPITATION

(See separate write-up: "Ludox" Lime Precipitation).

WEAK WASTE ACID SURGE TANK

Existing tank, polyester fiberglass construction, 20,000 gallons.

003 SAND FILTERS

Two new pressure sand filters, each 8 feet in diameter x 16 feet high.

003 MONITOR STATION

A concrete pit in the sewer equipped with instrumentation for continuous recording of:

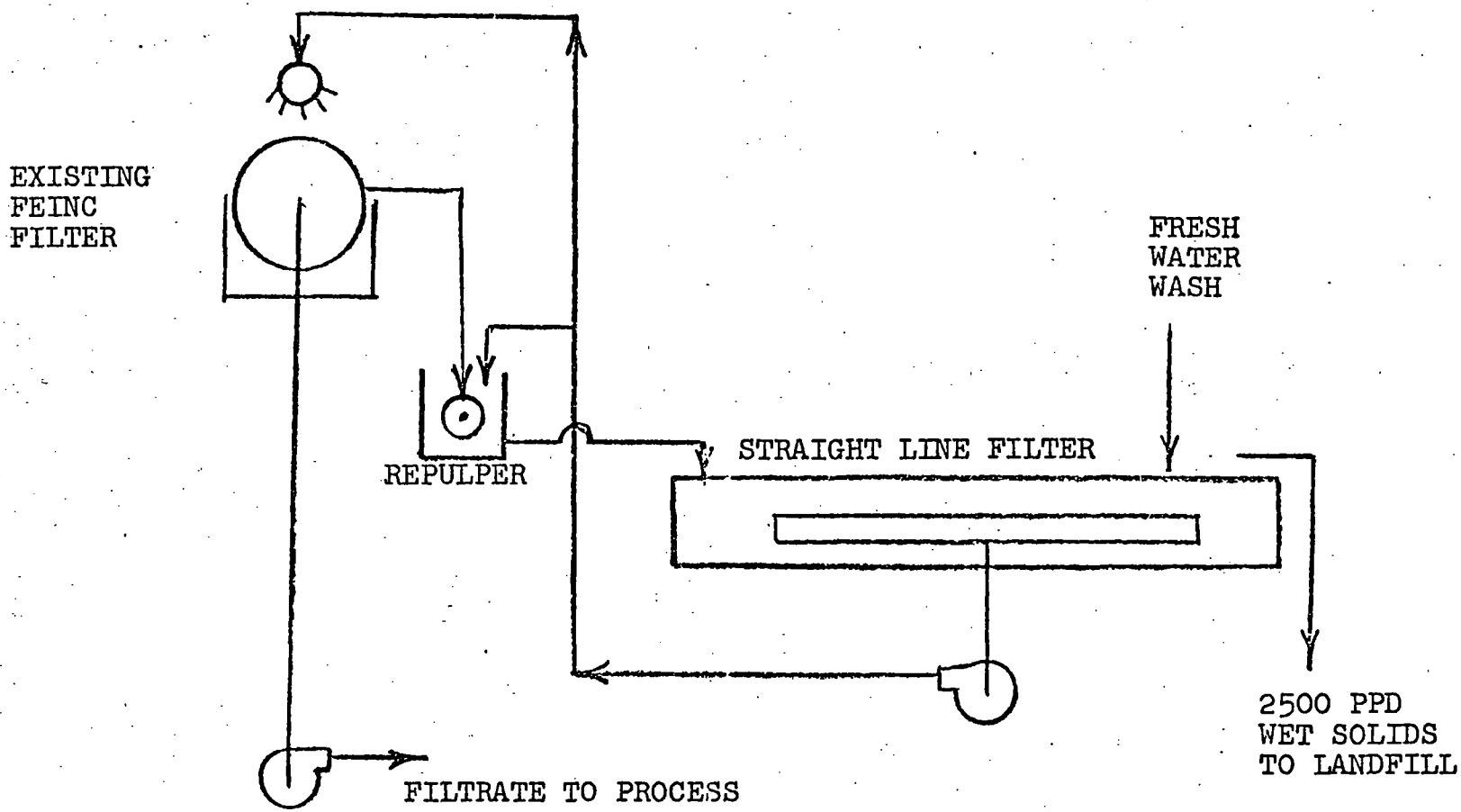
- pH
- conductivity
- temperature
- flow rate

Monitor pit will also contain a device for continuous flow-proportioned sampling of 003 effluent.

- "AMMATE" (AMMONIUM SULFAMATE) DRY CAKE FILTER

Filter cake from the existing filter will be repulped and refiltered to reduce soluble materials. The filtrate will be recycled to the process and solids will be taken to the landfill.

AMMATE® (AMMONIUM SULFAMATE) DRY CAKE FILTER



DESCRIPTION OF PROPOSED EQUIPMENT

FEINC FILTER

Existing rotary vacuum filter, 5 ft. dia. x 5 ft. long. Manufactured by FEINC. Modified by the addition of a 1 ft. x 7 1/2 ft. repulper manufactured by Ametek, Inc.

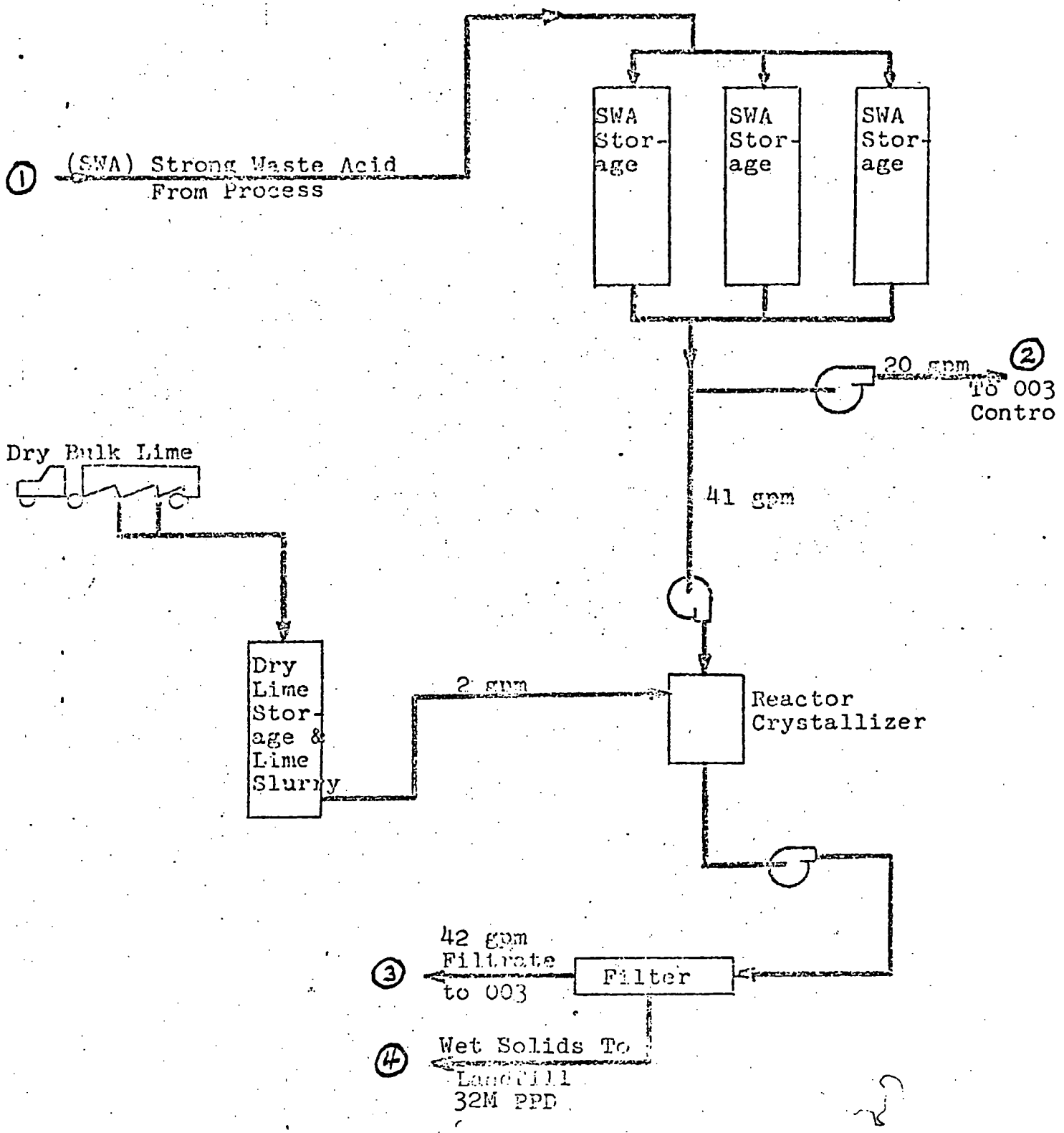
STRAIGHT LINE FILTER

A new 2 ft. wide x 7 ft. long horizontal belt vacuum filter, manufactured by Straight Line Filters, Inc., complete with a Siemens, liquid-ring vacuum pump, three stainless steel receivers and three Durco filtrate pumps.

- Ludox® (Colloidal Silica) Lime Precipitation

  Dilute waste sulfuric acid from Ludox® ion exchangers will be treated with lime to precipitate calcium sulfate. Calcium sulfate slurry will be filtered and solids taken to the landfill, thus reducing sulfate discharges to the river.

LIME PRECIPITATION OF "LUDOX" WASTE ACID



Rev. 6/73

Streams (1) – (4), are shown on West End (003) pH and Suspended Solids Control Flow Diagram.

DESCRIPTION OF PROPOSED EQUIPMENT

Strong Waste Acid Storage Tank

Three new 33,000 gallon storage tanks for dilute sulfuric acid service. Tanks to be made of acid resistant glass fiber reinforced polyester.

"Portube" - Package Lime Storage and Slurrying Unit

New 12' dia. 55' high unit for storing 50 tons of lime and producing a 35% milk-of-lime slurry on demand.

Neutralizer - Crystallizer

A new 15,000 gallon agitated vessel with automatic feed controls for continuous neutralization of waste acid.

Calcium Sulfate Filter

A new continuous rotary vacuum filter for dry cake discharge of calcium sulfate.

IC-11016

Attachment F

R. W. Wheatley, " " "

DUPONT
ESTABLISHED 1802

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

INDUSTRIAL CHEMICALS DEPARTMENT

East Chicago, Indiana
January 7, 1977

FILE - Env Control

T. J. Linton
Material Reclamation Systems
Central Research
Experimental Station
Wilmington

EAST CHICAGO SOLID WASTES

Attached is the information which you requested in your conversation with L. A. Kremer 12/10/76. If you have any questions, please contact R. W. Wheatley on Extension 328.

Bill MuGoodwin
Co-op Engineer

BM/ay
Attachment

Waste Compositions and Quantities

- Quantities
  - Environmental Control Precoat and Hardtac — 8035 T/Yr
  - Freon® Sludge — 3539 T/Yr
- Analysis

Compound	Precoat Filter Hardtac Sludge	Freon® Sludge
Free H_2O	56.5%	75.2%
$Ca(OH)_2$	4.1	8.27
CaF_2	0.0	16.5
$CaSO_4 \cdot 2H_2O$	13.3	0.0
$3SiO_2 \cdot H_2O$	26.0	0.0
Na_2O	0.1	0.0
Fe_2O_3	0.02	0.03
(Ba,Cd,Cu,Pb,Ni,Zn)	<13 ppm	<10 ppm
	100	100

FROM LETTER, BILL MCGOODWIN TO T J GLYNTON, JAN 7, 1977

Attachment G

(D. V. Luebke, " "
(W. C. Patterson, " "
(M. Z. Zatorski, " "
(W. S. Randle, " "
W. F. Stafford, " "
(C. A. Cremeans, " "
(M. P. O'Brien, " "
(L. A. Kremer, " "
(File: TAC 12.7
~~R. W. Wheatley,~~ " "
J. T. Sixsmith, " "

East Chicago, Indiana
September 8, 1976

File TAC 12.4

To: W. Laud

From: T. J. Valenti TJV

Solid Waste Disposal

Attached is the final Scope of Work for disposal of our solid process wastes in Gary Land Development landfill.

This should be attached to the Purchase Requisition which you are preparing for H. E. Burman.

TJV:mv

Attachments

SCOPE OF WORK

DISPOSAL OF SOLID WASTES OFF THE EAST CHICAGO PLANT

I. Introduction

This report contains details relating to completion of a solids handling contract for disposal of DuPont East Chicago solid process wastes in an off-plant landfill.

II. Timing

A trial period of 40 loads will begin approximately 10/76.

III. Background

- Present Conditions

  All solid process wastes generated from environmental control operations are landfilled on the plant.

- Proposal

  A waste hauler will provide 20 cu. yd. roll off containers to haul the waste solids to Gary Land Development landfill. The containers will be designed to keep material from leaking or slopping onto the road.

IV. Process Description

1. Roll off containers are to be provided by the waste hauler. The waste hauler is to provide sufficient number of containers to service the plant.

2. Plant responsibilities:
   - Remove tarpaulin from empty container
   - Load container
   - Brush loose material from side of container
   - Fasten tarpaulin
   - Call for pickup of full container.

3. Waste Hauler responsibilities
   - Spot empty containers
   - Pick up full containers
   - Check the tarpaulin for proper installation
     -- Adjust if required.
   - Dispose of material in Gary Land Development landfill except when:
     1) Material leaks from the container when it is being lifted onto the truck.
     2) DuPont specifies otherwise.

     In these cases dispose of the material in the DuPont landfill.
   - Dump at landfill. Remove any material which sticks to the inside of the container.
   - Maintain tailgate gasket and tarpaulin in good condition.
   - Fasten tarp before leaving landfill.
   - Return empty container.

4. Waste Hauler will weigh containers in and out on the Plant scale once/week when specified by DuPont.

V. Design Basis

- Volumes (approximate)*

Source	Ave.	Max.
1. Environmental Control-Precoat Filters	20 cu. yd/day	40 cu. yd/day
2. Environmental Control-Hardtac	4	8
3. Sulfamic-Straight Line	3-3/4	7-1/2
Total	27-3/4 cu. yd/day	55-1/2 cu. yd/day

Based on a volume produced over a weekend at capacity.

$$\frac{3(55.5 \text{ cu.yd/day})}{20 \text{ cu.yd/tray}} = 8 \frac{\text{Trays}}{\text{Weekend}}$$

*Subject to change based on operating rate.

- Contractor to pick up containers Monday through Friday during the hours of 7:30 a.m. and 4:00 p.m. as requested by DuPont.

VI. Equipment Details

- The waste hauler is to provide 20 cubic yard containers equipped with gaskets on the rear tailgate to prevent liquid seepage.
- The waste hauler is to provide tarpaulins for the tops of the containers to prevent solids from falling from the containers.
- The containers will be approximately 18' x 4' x 88"

VII. Architectural & Civil

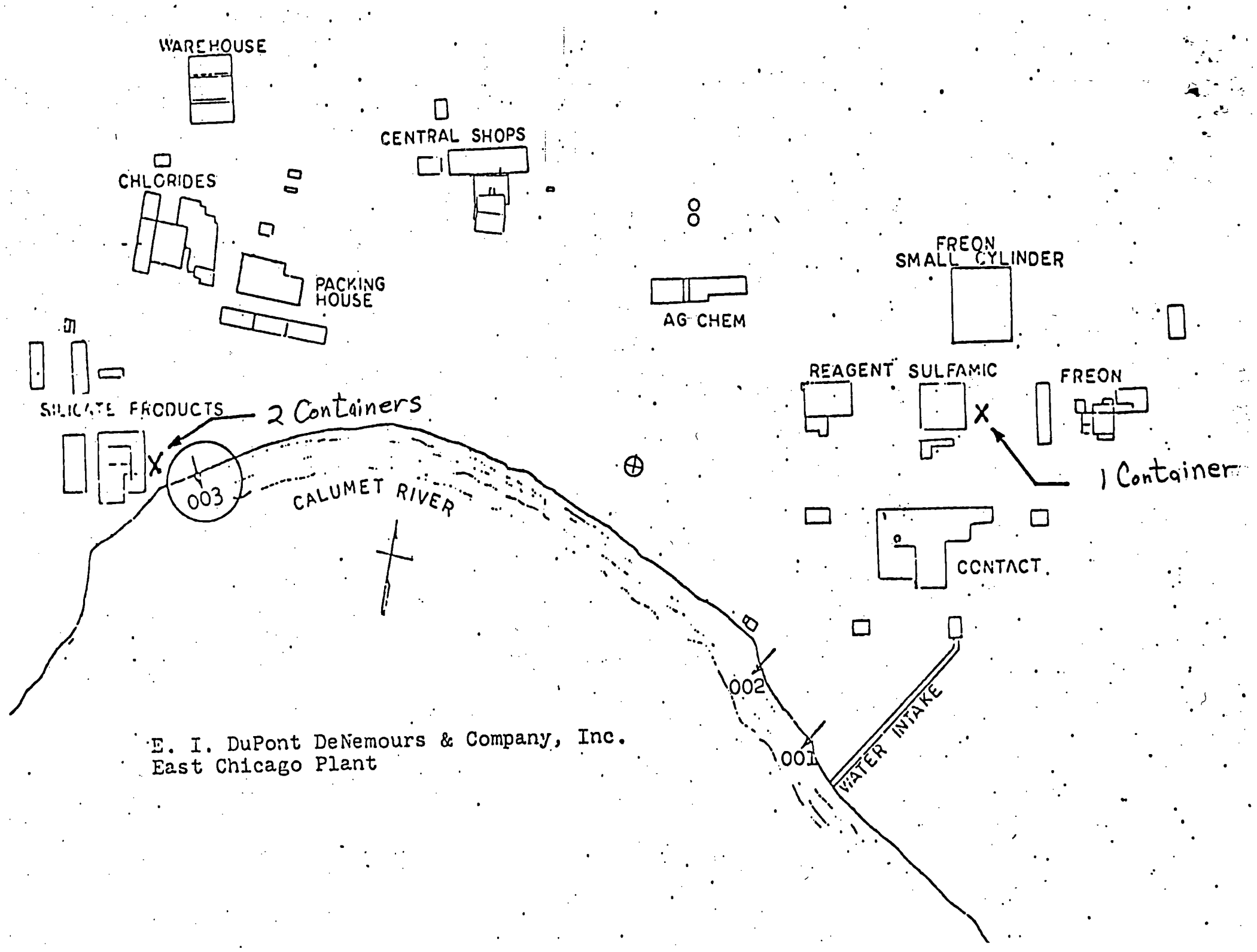
- See the following page for the plant map showing locations of the containers.

VIII. Waste Composition and Quantities

- Quantities
  - Environmental Control Precoat Filter Waste — 7150 T/yr.
  - Environmental Control Hardtac — 885 T/yr.
  - Sulfamic Straight Line — 1400 T/yr.
- Analysis

	PRECOAT FILTER	STRAIGHT LINE	HARDTAC	TOTAL (TONS/YR.)	OVERALL COMPOSITION
Free H_2O	63.1%	39.6%	3.1%	5100 T/yr.	53%
$Ca(OH)_2$	3.1	4.8	11.8	400	4
$3SiO_2 \cdot H_2O$	29	.2	.01	2100	22
Na_2O	.1	0.0	.06	8	.08
Al_2O_3	0.0	0.0	0.0	0	0
Fe_2O_3	.02	.03	.03	2	.02
$CaSO_4 \cdot 2H_2O$	4.8	54.4	85.0	1900	20
NH_3	-	.3	-	4	.04
$NH_3SO_3NH_2$	-	1.5	-	21	.22
(Ba,Cd,Cu, Pb,Ni,Zn	< 9.5ppm	< 4.9ppm	< 3.5ppm	.08	0
	100%	100%	100 %	9535 T/yr.	100%

FROM LETTER, TJ Valenti to W Lloyd
Sept 8, 1976


WAREHOUSE
CENTRAL SHOPS
CHLORIDES
PACKING HOUSE
AG CHEM
FREON
SMALL CYLINDER
REAGENT
SULFAMIC
FREON
SILICATE PRODUCTS
2 Containers
1 Container
003
CALUMET RIVER
CONTACT
002
001
WATER INTAKE
E. I. DuPont DeNemours & Company, Inc.
East Chicago Plant

National Spectrographic Laboratories, Inc.
SUBSIDIARY OF SCHILLER INDUSTRIES INC.
7650 HUB PARKWAY • CLEVELAND, OHIO 44125 • (216) 447-1550

Attachment G

TO E. I. DuPont DeNemours & Co.
LOGE 44477 Bldg. 110
5215 Kennedy Avee
East Chicago, IN 46312

Attn: P. Walko

File

DATE	CUSTOMER DESCRIPTION	YOUR ORDER NO.	REPORT NO.
11/16/79	Sludge (Environmental Precoat Filter)	LOGE 44477	11019

ELEMENTS DETERMINED	SAMPLE NO. 10-30-79	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.
SiO2	9.82						
Al2O3	0.028						
Fe2O3	0.031						
Na2O	0.23						
Tot.S	4.64						
Tot.Ca	1.59						

Lab No. 12867

We certify the above analysis to be the true results on the designated samples.

NATIONAL SPECTROGRAPHIC LABORATORIES, INC.

Lucile Chief Che

Sworn to and subscribed before me a Notary Public in and for the County of Cuyahoga, State of Ohio, this

DAY OF , 19

The information and data in this report are rendered under the conditions outlined in "Service Terms & Conditions" previously submitted. NSL assumes no liability and with respect to the use by the customer or any third person of any information contained in this service. NSL's only liability shall be limited to repeating the a without charge to customer or making a refund. No part of this report is to be reproduced for advertising without our consent in writing.

DUPLICATE REPORT OF ANALYSIS

ATTACHMENT G

SPECTRO-CHEMICAL RESEARCH LABORATORIES, INC.

ESTABLISHED 1946

CHEMISTS • SPECTROGRAPHERS • METALLURGISTS • CONSULTANTS

AREA CODE 312
TELEPHONE 267-1844

November 22, 1976

3300 WEST LAWRENCE AVENUE
CHICAGO, ILLINOIS 60625

E. I. du Pont de Nemours & Co., Inc.
5215 Kennedy Ave.
E. Chicago, Indiana 46312
Attn: Mr. R. A. Vogtlin

YOUR ORDER NO.: LOGE 31311

SAMPLE MARKED: Precoat Filter 10/

LOT: _____ HEAT: _____

LABORATORY NO.: 92825

	%
Si	base
Ca	major
Mg	.002
Fe	.003
Ba	none
Cd	none
Cr	none
Cu	.004
Pb	.0005
Hg	none
Ni	.0001
Se	none
Ag	.0001
Zn	.0005

Cost $26

SPECTRO-CHEMICAL RESEARCH LABORATORIES, Inc.

by

SPECTRO-CHEMICAL RESEARCH LABORATORIES, INC.

ATTACHMENT G

ESTABLISHED 1946

CHEMISTS • SPECTROGRAPHERS • METALLURGISTS • CONSULTANTS

AREA CODE 312
TELEPHONE 267-1844

May 7, 1976

3300 WEST LAWRENCE AVENUE
CHICAGO, ILLINOIS 60625

E. I. du Pont de Nemours & Co., Inc.
5215 Kennedy Ave.
E. Chicago, Indiana 46312
Attn: Mr. R. A. Vogtlin

YOUR ORDER NO.: LOGE-28298

SAMPLE MARKED:

LOT: HEAT: 4/28/~~88~~ 76

LABORATORY NO.: 79312-14

%	(ENVIR. PRECOAT FILTER) Sample # 1 SiO_2 Precoat 4/13/76	(SULFAMIC) Sample # 2 $CaSO_4$ Straight Line 4/13/76	(ENVIRONMENTL) Sample # 3 $CaSO_4$ Hardtac 4/16/76
Al	.002	none	none
Fe	.05	.04	.02
SiO_2	71.52	.43	.01
Ca	8.30	28.35	28.60
Na	.33	none	.05

Waste solids analysis - for Transport to Gary Landfill.
Submitted by T. Valenti.
Samples were all dried @ 110°C for about 2 hours. Results above on dried sample.
RAV

SPECTRO-CHEMICAL RESEARCH LABORATORIES, Inc.
by

National Spectrographic Laboratories, Inc.

SUBSIDIARY OF SCHILLER INDUSTRIES INC.
7650 HUB PARKWAY • CLEVELAND, OHIO 44125 • (216) 447-1550

ATTACHMENT G

TO E. I. DuPont DeNemours & Co.
5215 Kennedy Ave.
East Chicago, IN 46312

Attn: R. A. Vogtlin

DATE	CUSTOMER DESCRIPTION	YOUR ORDER NO.	REPORT NO.
2/6/80	Filter Sludge 1/10/80	LOGE-45369	02040-

ELEMENTS DETERMINED	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.	SAMPLE NO.
in%	2PM 1-10-80						
Ca	0.21						
Al	0.085						
Fe	0.080						
SiO2	96.1						
SO4	2.15						
N2	0.70						
% MOISTURE	79%						

Analysis on dried sample, or dry basis

Env. Control Sludge aft Filter 2 PM 1/10/80 J. Sixsmith

Lab No. 19057

We certify the above analysis to be the true results on the designated samples.

NATIONAL SPECTROGRAPHIC LABORATORIES, INC.

E. A. Mostanchi Chief Chem

Sworn to and subscribed before me a Notary Public in and for the County of Cuyahoga, State of Ohio, this

DAY OF , 19

DUPLICATE REPORT OF ANALYSIS

ATTACHMENT 14

MATERIAL NAME(S): Hyflo Supercel (diatomaceous earth filter aid)

REFERENCES:

1. Schepers, G. W. H., Theories of the Causes of Sili
2. Federal Register, Vol. 36, No. 105, May 29, 1971
3. American Conference of Governmental Industrial Hygienists
4. John Manville Corporation data

PHYSICAL PROPERTIES:

CHEMICAL PROPERTIES: [4]

% SiO_2	-	90.9
% Al_2O_3	-	3.7
% Fe_2O_3	-	1.5
% Na_2O	-	2.5

FIRE & EXPLOSION DATA: Non-flammable.

HEALTH DATA: [2] TLV amorphous silica including diatomaceous earth - 20 M ppcf or 80 mg/M^3

Moderate inhalation. Insufficient data at present to determine health hazard. "Silicosis" or "diatomitosis from inhalation of dust.

[3] Limit of 50 million particles/cf ft. or 15 mg/M^3.

ATTACHMENT H

Linwood Stone Products Company, Inc.

SUBSIDIARY OF McCARTHY IMPROVEMENT COMPANY

4321 EAST 60TH STREET
DAVENPORT, IOWA 52807
TELEPHONE: AC 319-359-5251

Product Sheet

Linwood Stone Products Co., Inc.

HYDRATED LIME

Chemical Analysis

Silicon Oxide	2.32%
Calcium Hydroxide	96.20
Magnesium Hydroxide	.69
Iron Oxide	.50
Aluminum Oxide	.19
Free Water	.65

Sieve Analysis

	% Passing
#30	100
#100	94.5
#200	91.3

ATTACHMENT J

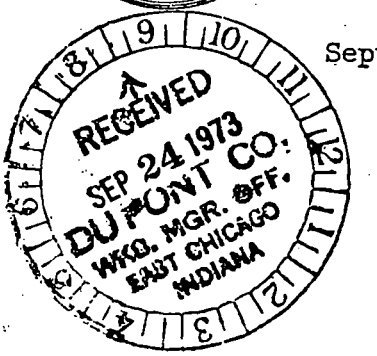
STATE OF INDIANA

INDIANAPOLIS 46206

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
633-5467

September 18, 1973



Mr. J. T. Sixsmith
Environmental Control Coordinator
E. I. duPont deNemours & Company
5215 Kennedy Avenue
P. O. Box 360
East Chicago, Indiana 46312

Dear Mr. Sixsmith:

Re: Wastewater Treatment

You are hereby notified that the Stream Pollution Control Board of the State of Indiana has, this 18th day of September, 1973, approved plans for modifying the E. I. duPont deNemours & Company wastewater treatment system at East Chicago. The proposed facilities are in accordance with the U. S. District Court Consent Decree of November 14, 1972.

The Company proposes consolidation of the nine existing outfalls into three outfalls to the Grand Calumet River. Storm sewers are to be separated from process sewers, and the existing process sewers combined in order to provide treatment including chemical addition, settling tanks, and sludge dewatering facilities. When completed, the plant will have three outfalls to the Grand Calumet that will include one noncontact cooling water discharge and two treated process water discharges. All other outfalls are to be removed and plugged.

Storm water piping will result in two sewers that serve the office as well as the chloride production and warehouse areas. Each storm sewer will discharge to a 200-foot by 5-foot by 5-foot trench dug in a cinder filled absorption area north of the plant. Each of these porous fill areas will accept the 7,500-gpm of storm water resulting from a 5-inch per hour rainfall intensity during a ten minute time interval. The storm sewer from the silicate products area will discharge to the treatment system located near outfall 003.

All dirty water from steam generation, air compressors, etc., will be conveyed by way of a separate sewer that flows to the East Chicago municipal sewerage system. All sewage from employees presently discharges to the sewer system.

Outfall 001 will discharge only noncontact cooling water from the freon and acid manufacturing areas near the east end of the plant.

Outfall 002 will convey treated wastewaters from the freon manufacturing, the sulfuric acid manufacturing, the sulfamic acid manufacturing and the agricultural chemical manufacturing areas. The treatment for all of these waste stream components are as follows:

A 2,200-gallon tank for collecting hydrofluoric acid, a 3,550-gallon waste caustic tank, a 35,000-gallon lime slurry tank, a 10,000-gallon contingency spill basin, a 1,500-gallon neutralization tank, a 46,000-gallon settling tank and three cartridge filter units are proposed for treatment of 1,400-gpm of acid wastewater. The combined effluent will have a final pH adjustment to be within the range of 6.5 to 9.0 prior to discharge. The discharge is to have continuous monitoring of pH, flow, temperature conductivity, as well as daily monitoring of 24-hour composite samples to provide values of suspended solids, dissolved solids, sulfates, chlorides, phosphorus, zinc and ammonia.

Outfall 003 will serve the chlorides and silicate products manufacturing area. Two 300,000-gallon equalization tanks, a rapid agitation coagulator, an 8,000-gallon flocculator, a 40,000-gallon thickener, two diatomaceous earth coated rotary filters are proposed for the treatment of 390-gpm of wastewater. Wastewaters from this treatment system will also blend with the treated waters from the Ludox system prior to final pH adjustment and filtration through two 8-foot diameter by 16-foot height pressure sand filters to treat the proposed 600-gpm flow.

The Ludox wastewater treatment consisting of three 33,000-gallon capacity polyester tanks to collect waste acid, a 50-ton capacity lime storage and slurry unit, a 15,000-gallon crystalizer tank and a three foot diameter Eimco filter will treat 210-gpm of wastewater before blending with other outfall 003 wastewaters. The 003 outfall is expected to have a maximum discharge flow of 600-gpm and will have similar monitoring equipment to that specified for 002.

The total plant will generate roughly 360,000 cubic feet of sludge per year consisting of essentially calcium sulfate, silicates, calcium hydroxide, and calcium fluoride. These sludges will be landfilled as dewatered material on a 7-acre site to the northeast of the plant (an area formerly used as a disposal site for calcium sulfate). The area will be filled as one acre diked segments containing a 6-foot depth of sludge that will be covered with earth. A clay and bentonite top and bottom layer will provide the required isolation for each cell of the sludge disposal area used for calcium fluoride sludges. The 7-acre plot is expected to handle 5 years accumulation of solid waste.

The Company expects the total net effluent to have the following characteristics as required by November 14, 1972, Consent Decree:

pH	- 6.5 to 9.0	
zinc	- 8 pounds average daily	- 12 pounds maximum per day
phosphorous	- 4 pounds average daily	- 6 pounds maximum per day
suspended solids	- 600 pounds average daily	- 900 pounds maximum per day
chlorides	- 2,500 pounds net daily	- 4,800 pounds maximum per da
sulfates	- 39,000 pounds net daily	- 58,500 pounds maximum per d
dissolved solids	- 74,000 pounds net daily	- 102,000 pounds maximum per

The plans were approved with the following conditions:

1. That additional equipment be included if the proposed facilities fail to provide adequate treatment.

2. That the Company submit to the Board monthly effluent monitoring reports in accordance with the requirements established in sections (f) and (g) in the Consent Decree signed November 14, 1972.

The plans were prepared by Company staff and submitted for consideration on July 23, 1973, with additional information supplied on August 6, 1973.

Very truly yours,

Oral H. Hert sum

Oral H. Hert
Technical Secretary

CLGough/lbw
I. W. Approval No. 880
cc: Lake County Health Department
East Chicago Sewage Treatment Plant

ATTACHMENT IC

STATE OF INDIANA

STREAM POLLUTION CONTROL BOARD

INDIANAPOLIS 46206

1330 West Michigan Street
633-5467

January 31, 1977

RECEIVED
PLT. MGR. OFFICE
DU PONT COMPANY
EAST CHICAGO, INDIANA

FEB 2 1977

AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

Mr. J.T. Sixsmith
Environmental Control Coordinator
E. I. duPont deNemours & Company
5215 Kennedy Avenue, P.O. Box 360
East Chicago, Indiana 46312

Dear Mr. Sixsmith:

Re: Industrial Waste Disposal

This will acknowledge receipt of your letter dated December 8, 1976, concerning your company's waste disposal. We wish to thank you for your prompt and complete response.

Our staff has reviewed the information submitted and determined your company is properly disposing of its waste materials. Your cooperation in this matter is greatly appreciated. If you should have any questions on waste disposal in the future, please contact our Solid Waste Management Section at AC 317/633-6400 for assistance.

Very truly yours,

Oral H. Hert

Oral H. Hert
Technical Secretary

JRB/sjk
cc: Water Pollution Control,
Enforcement Branch

ATTACHMENT I

SOIL INVESTIGATION

Dupont Property
East Chicago, Indiana

December 1978

Shilts, Graves & Associates, Inc.

1119 South Bend Avenue
South Bend, Indiana 46617
Telephone 219 / 233-6820

1278-710

Soil and Foundation Consultants
Materials Testing Services

WALTER L. SHILTS, PE, Pres.
CARL P. LITTRELL, PE, Vice-Pres.
LEROY D. GRAVES, PE, Secy.-Treas.

15 December 1978

Besozzi, Carpenter, and Ignelzi, Inc.
7501 Indianapolis Boulevard
Hammond, Indiana 46320

Attn: Mr. August Ignelzi

Gentlemen:

As authorized by your letter of 4 October 1978 we investigated the soil conditions on a portion of the E. I. Dupont property south of Gary Avenue and west of the East Chicago Incinerator Plant in East Chicago, Indiana. Our investigation has consisted of studying the geology of the area, reading the soil map of the area, and making six soil borings 30 to 40 feet deep.

Geology tells us that the site lies in the area of glacial Lake Chicago between its Tolleston Beach and the present Lake Michigan. This area is covered with sand beach low ridges parallel to Lake Michigan and separated by swampy swales often filled with peat. The sand depth varies in depth from 20 to 40 feet and is underlaid by 60 to 85 feet of blue pebbly clay. Sand layers or pockets may lie under the clay, but the total depth to bedrock is between 100 and 150 feet. The ground surface varies in elevation from the river level of about 582 to 595 at the ridge tops.

The soil map shows that the surface soils are Carlisle muck near the river, Tawas muck in the southwest corner and the northern one-third of the property, and Oakville-Tawas complex in the remaining one-half of the property. The Carlisle soils are described as a deep poorly drained organic soil developed in shallow ponds or bogs. The typical soil profile is 4 to more than 6 feet of peat overlying sand, marl or silt. Water tables are high. The Tawas soils are described as deep very poorly drained soils developed on ponds or bogs. The typical soil profile is one to 3.5 feet of peat over sand. Water tables are high. The Oakville-Tawas complex is described as a poorly drained soil developed on organic materials and sandy mineral soils. The complex is characterized by a pattern of long narrow parallel ridges and sloughs. The alternating strips are usually 60 to 100 feet wide. The ridges are Oakville fine sand and the sloughs are Tawas muck. The Oakville soil has a typical soil profile of up to four inches of sand topsoil underlaid by four feet of fine sand grading into gray brown sand below depths of 5 feet. Water tables are usually more than 4 feet below the surface.

The logs of the six soil borings together with graphic logs and a location sketch are attached hereto. Samples of all soils encountered will be stored in our laboratory for 60 days after which they will be discarded unless you want them.

The soil borings show that in the Oakville soil area (Borings 3 and 4) the soil consists of 0 to 0.3 inches of sand topsoil underlaid by sand to depths of 32 to 36 feet (elevation 557.0 and then silty clay. The sand was loose to depths of 6 to 12 feet and medium below that. The water table was 5 to 8 feet below the surface at about elevation 583. In the edge of the Tawas muck area (borings 1, 2,5, and 6) the soil consisted of 0.4 to 2.0 feet of peaty topsoil underlaid by sand to depths of 27.5 to 33 feet (elevation 555 to 556). The sand was loose to depths of 3 to 6 feet and medium below that. The water table was 2 to 4 feet below the surface at elevation 582 to 583. The silty clay in all the borings was medium to stiff in consistency. Hand auger probings in the Carlisle muck area near the river showed more than 6 feet of peat in places with the water table near the ground surface. Hand auger probings in the swales between the sand ridges showed less than two feet of peat on top of the sand. Water was close to the surface in the lower swales. The lower swales had an encrustation of a white substance on the surface and vegetation was stunted or dead in the encrusted areas. There was no evidence of any waste material being dumped on the surface anywhere on the property. Scrub strees are growing on the sand ridges and grass and cattails are growing in the peat regions.

Groundwater from Borings 1 and 3 were analyzed for pollution as well as surface water from a low swale and groundwater from a swale near Boring 5. Also the white encrustation was identified by chemical tests. The results are shown on the attached reports of chemical tests. The test results show that the white encrustation is primarily sulphates brought to the surface by evaporation of the groundwater which contains sulphates (See tests made on water in surface pond and Boring 5 water sample). None of the water samples contained pesticides or significant amounts of PCB's. The water sample from Boring 1 contained less sulphate than at Boring 5 or water in the north pond indicating that the sulphates are being fed into the ground from the surface water in the low spots. The analysis of the water from Borings 1 and 3 for mineral content shows no significant difference between the water in the higher sand ground and the water in the low ground near the river except a much higher iron content near the river. This is probably from the scrap metal operations up river from the site.

We understand that the site is being considered for any one of several uses. As a recreational and open space development the site would appear to be useable providing the surface water from the low spots to the northwest is prevented from entering the low swales on

the site and killing vegetation. The sand ridges and sand below the peat will safely support footing loads of 4000 pounds per square foot for any structures. The only apparent drawbacks to this type of development is the fact that the flood level of the river has reached elevation 583 to 584 in the past which would flood some of the low ground. Also, the pipeline and power line easements may interfere with the overall planning for the site.

The higher ground on the site can readily be used for additional vehicle storage space. The lower ground would have to be stabilized by removing the peat and filling the excavation with sand from the higher ground. Buildings for storage of vehicles can be constructed anywhere on the site except in the peat area near the river. No buildings could be built in the pipeline and powerline easements.

The site could be used for city nursery facilities with proper fertilization and drainage. Irrigation would be needed in the higher ground. Service buildings and drives would need to be located to avoid the deepest peat and lowest ground.

Use of the land as a sanitary landfill for incinerator residue depends a great deal on the chemical inertness of the residue. The larger glassy particles of the residue are probably chemically inert while the finer particles from the burning of organic materials are probably not inert. Any chemically active waste will be too close to the water table and will probably pollute the groundwater unless a seal is placed between the water table and the waste. There are great quantities of sand on the site both above and below the water table. This sand is excellent fill material for construction projects. Mining of the sand from below the water table would create a lake that could be worked into a recreation and open space use of the site.

In summary, the site does not appear to have been polluted to any significant extent by past use. The site can readily be used as a recreation and open space development, a vehicle storage space, a city nursery, or a source of sand fill for construction projects. Feasibility of using the site for disposal of incinerator residue depends on the economics of balancing the cost of placing a seal between the groundwater and the residue against the cost of transporting the residue elsewhere.

We are sure that the Sanitary District has many factors in addition to the soil conditions that they must consider in making their decision concerning the purchase and use of the property. We will be glad to discuss the effect of the soil properties on the land use as they make their decisions.

Sincerely,

SHILTS, GRAVES AND ASSOCIATES, INC.

Leroy D. Graves

Leroy D. Graves, PE.
Secretary - Treasurer

krr/

P.O. Box 521,
Notre Dame, Ind. 46556
Telephone: 233-6820

SHILTS, GRAVES AND ASSOCIATES, INC.

TEST BORING LOG

Boring No. 1
Sheet 1 of 1
Job No. 78-292

PROJECT DuPont Property

City East Chicago County Lake State Indiana

Boring Location as shown on location sketch Datum Mean sea level

Date Started 10-10-78 Date Completed 10-10-78 Surface Elevation 582.8

Weather cloudy/mild Boring Method hollow auger

GROUND WATER DEPTH

Sampler: Type split barrel Casing: Size At Completion 2.0 Ft.

Size 2.0" O.D. Length Used With Casing Removed Ft.

Casing Hammer: Wt. Drop After Hours Ft.

Sampler Hammer: Wt. 140 lb. Drop 30 inches

Soil Layer Limits From	Soil Layer Limits To	Soil Description	Sample Data No.	Sample Data From	Sample Data To	Sample Data N	Remarks
0.0	0.4	Topsoil- dark brown and black peaty topsoil	1	0.0	1.5	1-2-3	medium
0.4	7.8	Sand- brown fine grained sand	1	0.0	1.5	1-2-3	loose, moist
			2	1.5	3.0	4-5-4	loose, wet
			3	3.0	4.5	2-5-7	medium, wet
			4	4.5	6.0	4-5-6	medium, wet
			5	6.0	7.5	4-6-9	medium, wet
7.8	14.0	Sand- brownish gray fine grained sand	6	7.5	9.0	5-8-11	medium, wet
			7	9.0	10.5	5-6-11	medium, wet
			8	10.5	12.0	4-7-10	medium, wet
			9	12.0	13.5	6-8-12	medium, wet
14.0	21.0	Sand- gray brown fine grained sand	10	13.5	15.0	6-6-8	medium, wet
			11	15.0	16.5	5-7-7	medium, wet
			12	16.5	18.0	5-8-8	medium, wet
			13	18.5	19.5	6-7-10	medium, wet
21.0	27.5	Sand- gray fine grained sand	14	23.5	25.0	7-8-10	medium, wet
27.5	30.0	Silty Clay- gray silty clay trace gravel	15	28.5	30.0	3-2-5	medium, wet
							End of boring, 30.0 feet

NOTES:

N Indicates the number of blows required to advance a 2" OD split barrel sampler at 6" intervals by means of a 140 lb. weight falling 30"

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SHILTS, GRAVES AND ASSOCIATES, INC.

TEST BORING LOG

Boring No. 2
Sheet 1 of 1
Job No. 78292

PROJECT Dupont Property

City East Chicago — County Lake — State Indiana

Boring Location as shown on location sketch — Datum Mean sea level

Date Started 10-11-78 — Date Completed 10-11-78 — Surface Elevation 582.9

Weather cloudy cloudy cool — Boring Method hollow auger — GROUND WATER DEPTH

Sampler: Type split barrel — Casing: Size — At Completion hole caved 1.9 Ft.

Size 2.0" O.D. — Length Used — With Casing Removed — Ft.

Casing Hammer: Wt. — Drop — After — Hours — Ft.

Sampler Hammer: Wt. 140 lb. — Drop 30 inches

Soil Layer Limits From	Soil Layer Limits To	Soil Description	Sample Data No.	From	To	N	Remarks
0.0	0.3	Topsoil- black peaty topsoil	1	0.0	1.5	1-1-1	soft
0.3	1.2	Sand- brown fine grained sand trace peat	1	0.0	1.5	1-1-1	very loose
1.2	2.0	Peat- black peat	2	1.5	3.0	3-6-7	stiff, wet
2.0	3.3	Sand- dark brown fine	2	1.5	3.0	3-6-7	medium, wet
3.3	7.0	Sand- brown fine grained sand	3	3.0	4.5	4-7-11	medium, wet
			4	4.5	6.0	4-9-8	medium, wet
			5	6.0	7.5	2-3-8	medium, wet
7.0	11.3	Sand- gray fine grained sand trace peat	6	7.5	9.0	7-7-9	medium, wet
			7	9.0	10.5	6-8-8	medium, wet
			8	10.5	12.0	4-4-3	loose, wet
11.3	17.0	Sand- gray fine grained sand with lenses of peat and roots	9	12.0	13.5	2-3-3	loose, wet
			10	13.5	15.0	3-3-3	loose, wet
			11	15.0	16.5	2-3-2	loose, wet
17.0	28.0	Sand- gray fine grained sand	12	16.5	18.0	4-8-12	medium, wet
			13	18.0	19.5	6-10-15	medium, wet
			14	23.5	25.0	6-8-9	medium, wet
28.0	30.0	Silty Clay- gray silty clay	15	28.5	30.0	4-3-5	stiff, wet
							End of boring, 30.0 feet

NOTES:

N indicates the number of blows required to advance a 2" OD split barrel sampler at 6" intervals by means of a 140 lb. weight falling 30"

SB001-102077-1009

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SHILTS, GRAVES AND ASSOCIATES, INC.

TEST BORING LOG

Boring No. 3
Sheet 1 of 1
Job No. 78-292

PROJECT DuPont Property

City East Chicago | County Lake | State Indiana

Boring Location as shown on location sketch | Datum Mean sea level

Date Started 10-11-78 | Date Completed 10-11-78 | Surface Elevation 591.2

Weather cloudy cool | Boring Method hollow auger | GROUND WATER DEPTH

Sampler: Type split barrel | Casing: Size | At Completion hole caved 7.9 Ft.

Size 2.0" O.D. | Length Used | With Casing Removed ____ Ft.

Casing Hammer: Wt. ____ | Drop ____ | After ____ Hours ____ Ft.

Sampler Hammer: Wt. 140 lb. | Drop 30 inches

Soil Layer Limits From	To	Soil Description	Sample Data No.	From	To	N	Remarks
0.0	0.3	Topsoil- black sandy topsoil	1	0.0	1.5	1-0-1	very loose
0.3	1.8	Sand- brown fine grained sand	1	0.0	1.5	1-0-1	very loose
1.8	8.3	Sand- light brown fine grained sand	2	1.5	3.0	1-2-2	loose
			3	3.0	4.5	2-3-4	loose
			4	4.5	6.0	3-5-5	loose
			5	6.0	7.5	5-6-9	medium
8.3	13.8	Sand- brown fine grained sand	6	7.5	9.0	8-8-7	medium, wet
			7	9.0	10.5	3-4-5	loose, wet
			8	10.5	12.0	3-5-5	loose, wet
			9	12.0	13.5	5-6-7	medium, wet
13.8	34.8	Sand- gray fine grained sand	10	13.5	15.0	5-9-10	medium, wet
			11	15.0	16.5	6-8-12	medium, wet
			12	16.5	18.0	5-9-7	medium, wet
			13	18.0	19.5	6-8-8	medium, wet
			14	23.5	25.0	6-9-11	medium,wet
			15	28.5	30.0	7-11-14	medium, wet
			16	33.5	35.0	6-14-17	dense, wet
34.8	36.0	Sand- gray fine to med. grained sand	16	33.5	35.0	6-14-17	dense, wet
36.0	40.0	Silty Clay- gray silty clay	17	38.5	40.0	3-4-5	stiff, wet
							End of boring, 40.0 feet

NOTES:

N Indicates the number of blows required to advance a 2" OD split barrel sampler at 6" intervals by means of a 140 lb. weight falling 30"

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SHILTS, GRAVES AND ASSOCIATES, INC.

TEST BORING LOG

Boring No. 4
Sheet 1 of 1
Job No. 78-292

PROJECT DuPont Property

City East Chicago County Lake State Indiana

Boring Location as shown on location sketch Datum Mean sea level

Date Started 10-10-78 Date Completed 10-10-78 Surface Elevation 588.2

Weather cloudy, cool Boring Method hollow auger GROUND WATER DEPTH

Sampler: Type split barrel Casing: Size At Completion hole caved 3.1 Ft.

Size 2.0" O.D. Length Used With Casing Removed Ft.

Casing Hammer: Wt. Drop After Hours Ft.

Sampler Hammer: Wt. 140 lb. Drop 30 inches

Soil Layer Limits From	Soil Layer Limits To	Soil Description	Sample Data No.	From	To	N	Remarks
0.0	0.3	Sand- light brown fine grained sand	1	0.0	1.5	1-1-2	very loose
0.3	1.8	Sand- brown and dark brown fine grained sand trace roots	1	0.0	1.5	1-1-2	very loose
1.8	6.5	Sand- light brown fine grained sand	2	1.5	3.0	2-3-4	loose
			3	3.0	4.5	3-3-4	loose
			4	4.5	6.0	3-4-4	loose, wet at 5.0 feet
6.5	7.5	Sand- gray brown fine grained sand	5	6.0	7.5	5-6-6	medium, wet
7.5	32.0	Sand- gray fine grained sand trace peat at 11.8 ft	6	7.5	9.0	3-6-9	medium, wet
			7	9.0	10.5	5-9-10	medium, wet
			8	10.5	12.0	4-7-10	medium, wet
			9	12.0	13.5	4-7-9	medium, wet
			10	13.5	15.0	3-9-11	medium, wet
			11	15.0	16.5	5-8-11	medium, wet
			12	16.5	18.0	6-10-14	medium, wet
			13	18.0	19.5	5-12-15	medium, wet
			14	23.5	25.0	7-12-19	dense, wet
			15	28.5	30.0	8-15-18	dense, wet
32.0	35.0	Silty Clay- gray silty clay trace gravel	16	33.5	35.0	2-3-5	stiff, wet
							End of boring, 25.0 feet

NOTES:

N indicates the number of blows required to advance a 2" OD split barrel sampler at 6" intervals by means of a 140 lb. weight falling 30"

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SHILTS, GRAVES AND ASSOCIATES, INC.

TEST BORING LOG

Boring No. 5
Sheet 1 of 1
Job No. 78-292

PROJECT DuPont Property

City East Chicago | County Lake | State Indiana

Boring Location as shown on location sketch | Datum Mean sea level

Date Started 10-10-78 | Date Completed 10-10-78 | Surface Elevation 586.1

Weather cloudy mild | Boring Method hollow auger | GROUND WATER DEPTH

Sampler: Type split barrel | Casing: Size | At Completion hole caved 3.2 Ft.

Size 2.0" O.D. | Length Used | With Casing Removed ____ Ft.

Casing Hammer: Wt. ____ | Drop ____ | After ____ Hours ____ Ft.

Sampler Hammer: Wt. 140 lb. | Drop 30 inches

Soil Layer Limits From	Soil Layer Limits To	Soil Description	Sample Data No.	From	To	N	Remarks
0.0	0.6	Topsoil- black peaty topsoil	1	0.0	1.5	1-1-1-	soft
0.6	5.0	Sand- light brown fine grained sand	2	1.5	3.0	3-3-4	loose
			3	3.0	4.5	3-4-4	loose, wet at 3.5 feet
5.0	7.8	Sand- brown fine grained sand	4	4.5	6.0	2-2-4	loose, wet
			5	6.0	7.5	2-4-6	loose, wet
7.8	11.0	Sand- gray brown fine grained sand	6	7.5	9.0	8-12-12	medium, wet
			7	9.0	10.5	6-9-13	medium, wet
11.0	22.0	Sand- brown gray fine grained sand	8	10.5	12.0	6-11-14	medium, wet
			9	12.0	13.5	7-10-16	medium, wet
			10	13.5	15.0	7-9-15	medium, wet
			11	15.0	16.5	8-11-15	medium, wet
			12	16.5	18.0	6-12-17	medium, wet
			13	18.0	19.5	8-11-17	medium, wet
22.0	32.0	Sand- dark gray fine grained sand	14	23.5	25.0	7-12-18	medium, wet
			15	28.5	30.0	6-14-20	dense, wet
32.0	32.5	Gravel- gray med. to coarse grained gravel	15	28.5	30.0	6-14-20	dense, wet
32.5	35.0	Silty Clay- gray silty clay trace gravel	16	33.5	35.0	3-3-6	stiff, wet
							End of boring, 35.0 feet

NOTES:

N Indicates the number of blows required to advance a 2" OD split barrel sampler at 6" intervals by means of a 140 lb. weight falling 30"

SB901-102077-1000

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SHILTS, GRAVES AND ASSOCIATES, INC.

TEST BORING LOG

Boring No. 6
Sheet 1 of 1
Job No. 78-292

PROJECT DuPont Property

City East Chicago County Lake State Indiana
Boring Location as shown on location sketch Datum Mean sea level
Date Started 10-11-78 Date Completed 10-11-78 Surface Elevation 588.0
Weather partly cloudy cool Boring Method hollow auger GROUND WATER DEPTH
Sampler: Type split barrel Casing: Size At Completion 4.7 Ft.
Size 2.0" O.D. Length Used With Casing Removed Ft.
Casing Hammer: Wt. Drop After Hours Ft.
Sampler Hammer: Wt. 140 lb. Drop 30 inches

Soil Layer Limits From	Soil Layer Limits To	Soil Description	Sample Data No.	From	To	N	Remarks
0.0	1.3	Fill- black peat and cinder fill	1	0.0	1.5	2-3-3	loose
1.3	5.5	Sand- light brown fine grained sand	2	1.5	3.0	2-2-5	loose
			3	3.0	4.5	4-4-4	loose
			4	4.5	6.0	4-6-7	medium, wet at 5.5 ft.
5.5	33.0	Sand- light gray fine grained sand	5	6.0	7.5	4-9-8	medium, wet
			6	7.5	9.0	7-9-12	medium, wet
			7	9.0	10.5	6-8-12	medium, wet
			8	10.5	12.0	7-10-14	medium, wet
			9	12.0	13.5	8-11-16	medium, wet
			10	13.5	15.0	8-8-15	medium, wet
			11	15.0	16.5	9-12-18	medium, wet
			12	16.5	18.0	7-11-15	medium, wet
			13	18.0	19.5	8-10-14	medium, wet
			14	23.5	25.0	7-9-11	medium, wet
			15	28.5	30.0	8-8-8	medium, wet
33.0	35.0	Silty Clay- gray silty clay with sand seams	16	33.5	35.0	7-5-5	stiff, wet
							End of boring, 35.0 feet

NOTES:

N denotes the number of blows required to advance a 2" OD split barrel sampler at 5' intervals by means of a 140 lb. weight falling 30"